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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/942,323	08/29/2001	Walter L. Moden	3089.2US (96-0734.2)	9742
24247	7590	02/05/2004	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			LEE, HSIEN MING	
			ART UNIT	PAPER NUMBER
			2823	
DATE MAILED: 02/05/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/942,323

Applicant(s)

MODEN ET AL.

Examiner

Hsien-Ming Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-421 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 34-65, 159-187, 216-268 and 341-421 is/are allowed.
- 6) ☒ Claim(s) 1, 4-8, 12, 15-17, 19-21, 24-26, 66, 69-72, 76, 79-81, 83-85, 88-90, 98, 101-103, 107, 110-112, 115-116, 119-121, 129, 132-133, 137, 140-142, 144-146, 149-151, 188, 191-192, 197-199, 202-203, 206, 208, 269, 272-273, 276-277, 280-281, 284-286, 294, 297-298, 301-302, 305, 308-310, 318, 321-322, 325-326, 329, 332-333 is/are rejected.
- 7) ☒ Claim(s) 2-3, 9-11, 13-14, 18, 22-23, 27-33, 67-68, 73-75, 77-78, 82, 86-87, 91-97, 99-100, 104-106, 108-109, 113-114, 117-118, 122-128, 130-131, 134-136, 138-139, 143, 147-148, 152-158, 189-190, 193-196, 200-201, 204-205, 207, 209-215, 270-271, 274-275, 278-279, 282-283, 287-293, 295-296, 299-300, 303-304, 306-307, 311-317, 319-320, 323-324, 327-328, 330-331, 334-340 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The <sup>corrected</sup> drawing(s) filed on 9/24/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_ .  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_ .

Part of Paper No. 013004

## DETAILED ACTION

### *Remarks*

1. Applicant's RCE filing request is acknowledged.
2. Claims 1-421 are pending in the application.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 5-8, 15-17, 19-21, 24, 66, 70-72, 79-81, 83-85, 88, 98, 102-103, 110-112, 115-116, 119, 129, 133, 140-142, 144-146, 149, 269, 273, 276-277, 280-281, 284, 294, 298, 301-302, 305, 308 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujita (JP-02-37964; submitted by applicant).

In re claims 1, 5, 66, 98, 129, 269, 294, Fujita, in Figs. 1-2 and related text, expressly teaches the claimed method for applying viscous material (i.e. molten solder liquid) to at least one semiconductor component 7 (substrate), said method comprising :

- providing a viscous material pool 14 (molten solder tank) containing viscous material, said viscous material pool 14 shaped such that an exposed surface (i.e. top surface) of the viscous material is located in a precise location and including at least one upward facing opening, said at least one upward facing opening exposing at least said exposed surface of the viscous material;

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- aligning at least one semiconductor component 7 over said viscous material pool 14 and above said at least upward facing opening;
- biasing said at least one semiconductor component 7 downward proximate the viscous material in said viscous material pool 14 because said viscous material pool 14 can downward and upward simultaneously;
- controlling the height of said exposed surface of said viscous material using a detection mechanism, i.e. laser transmitter/receiver 8, c circuit 11 and a control device 10;
- leveling said exposed surface of said viscous material using level block 25; and
- wetting a specific location of said at least one semiconductor component 7 with said viscous material.

In re claims 6-8, 70-72, 102-103, 133, 273, 298, Fujita also teaches that said wetting comprises biasing said at least one semiconductor component 7 downward proximate the viscous material in said viscous material in said viscous material pool 14 such that said specific location of said at least one semiconductor component contacts said exposed surface of said viscous material because the viscous material pool 14 can move upward and downward simultaneously via an *electrically-powered biasing mechanism*, including a serve motor driving device 23.

In re claims 15-17, 19, 79-81, 83, 110-112, 140-142, 144, 276-277, 301-302, Fujita also teaches comprising leveling said exposed surface of said viscous material prior to said wetting a specific location of said at least one semiconductor component 7 because there is a leveling block or wiper 25 to perform leveling, flattening

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In re claims 20-21, 24, 84-85, 88, 115-116, 119, 145-146, 149, 280-281, 284, 305, 308, Fujita also teaches controlling the height of said exposed surface of said viscous material using a detection mechanism, i.e. laser transmitter/receiver 8 with control signal to determine the height of the exposed surface of said viscous material and control delivery of said viscous material to said viscous material pool.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 12, 25, 26, 69, 76, 89-90, 101, 107, 120-121, 132, 137, 150-151, 188, 191-192, 197-199, 202-203, 206, 208, 272, 285-286, 297, 309-310, 318, 321-322, 325-326, 329, 332-333 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujita in view of Ahmad (US 6,204,093).

In re claim 4, 69, 101, 132, 191, 272, 297, 321, one of the ordinary skilled in the art would have been motivated to include any one of the claimed component (i.e. lead finger, bus, bars and a die) with the semiconductor component 7, since the claimed component are a part of semiconductor device, as evidenced by Ahmad (col. 4, lines 50-64).

In re claims 12, 76, 107, 137, 188, the selection of the thickness is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA

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1980)(discovery of optimum value of result effective variable in a known process is obvious). In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. See M.P.E.P. 2144.05, III

In re claims 25, 89, 120, 150, 285, 309, 333, Fujita does not teach using an ultrasonic transmitter as the detection mechanism. However, using ultrasonic transmitter, which is an art-recognized equivalence, as the detection mechanism for detecting level has been widely used in the art, as evidenced by Ahmad (col. 6, lines 42-56).

Therefore, it would have been obvious to one of the ordinary skill in the art, at the time the invention was made, to substitute the laser transmitter of Fujita with the ultrasonic transmitter of Ahmad for detection mechanism since they are equivalent device for detecting level.

In re claim 26, 90, 121, 151, 208, 286, 310, 318, Fujita does not expressly teach including multiple reservoirs housing said viscous material. However, these claims are prima facie obvious without showing that the claimed limitation achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688(Fed. Cir. 1996)(claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and In re Aller, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art general conditions is obvious). One of the

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ordinary skilled art would have been motivated to use multiple reservoirs to house said viscous material since it would increase performance efficiency.

In re claims 192, 322, Fujita also teaches providing an electrically-powered biasing mechanism, including a serve motor driving device 23, configured to place said at least one semiconductor component 7 proximate said viscous material.

In re claims 197-199, 325-326, Fujita also teaches comprising leveling said exposed surface of said viscous material prior to said wetting a specific location of said at least one semiconductor component 7 because there is a leveling block or wiper 25 to perform the job.

In re claim 202-203, 206, 329, 332, Fujita also teaches controlling the height of said exposed surface of said viscous material using a detection mechanism, i.e. laser transmitter/receiver 8 with control signal to determine the height of the exposed surface of said viscous material.

***Allowable Subject Matter***

7. Claims 34-65, 159-187, 216-268, 341-421 are allowed.
8. Claims 2-3, 9-11, 13-14, 18, 22, 23, 27-33, 67-68, 73-75, 77-78, 82, 86-87, 91-97, 99-100, 104-106, 108-109, 113-114, 117-118, 122-128, 130-131, 134-136, 138-139, 143, 147-148, 152-158, 189-190, 193-196, 200-201, 204-205, 207, 209-215, 270-271, 274-275, 278-279, 282-283, 287-293, 295-296, 299-300, 303-304, 306-307, 311-317, 319-320, 323-324, 327-328, 330-331, 334-340 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
9. The following is a statement of reasons for the indication of allowable subject matter:



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The prior art of record at least neither teaches nor suggests viscous material containing adhesive or polyimide, which is selected from the group consisting of thermoplastics, thermoset resins, flowable pates and B-stage adhesive material; pumping said viscous material into said viscous material pool sufficient to contact said specific location of said at least one semiconductor component; and coating a surface of the semiconductor component with a surfactant prior to wetting step.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-Ming Lee whose telephone number is 703-305-7341 (before feb.4, 2004) or 571-272-1863 (on and after Feb. 4, 2004). The examiner can normally be reached on M-F (9:00 ~ 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 703-306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Hsien-Ming Lee  
Examiner  
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Jan. 31, 2004